A comparison of different extenders for cryopreservation of semen in white-tailed deer

Jamie Stewart, Clifford Shipley, Ashley Seder, Igor Canisso, Eleonora Po, Robyn Ellerbrock, Fabio Lima

College of Veterinary Medicine, University of Illinois at Urbana-Champaign, Urbana, IL

Deer farming is an economically important and continuously growing industry in the United States, with its sustainability relying on the use of artificial insemination with frozen semen to effectively disseminate valuable genetics. While anecdotally, egg yolk-based semen extenders have been used with some success in white-tailed deer, there are currently no data comparing its use to soybean-based (AM, AndroMed®) extenders. The objective of the current study was to compare the use of AM extender to different egg yolk-based extenders (OR, Ovine Red®; TR, Triladyl®; BI4, Biladyl® 4%; BI6, Biladyl® 6%; BI8, Biladyl® 8%). Our hypothesis was that semen extended in egg yolk-based extenders would exhibit a greater decline in sperm motility than semen extended in AM extender. White-tailed deer (n = 6) were anesthetized with tiletamine-zolazepam (0.4 mg/lb each) and xylazine (1 mg/lb) intramuscularly via dart gun. Semen was collected using electroejaculation, and the ejaculate from each buck was divided evenly amongst six extenders: AM, OR, TR, BI4, BI6, BI8. Each sample was diluted to a concentration of 120 million sperm/mL, cooled to 5°C, and then incubated for 2 to 4 h. Semen was loaded into 0.5 mL straws and frozen manually by placing straws on a rack in liquid nitrogen vapor at a distance of 4 cm horizontally above the liquid nitrogen level for 10 m before submerging them into the liquid nitrogen for final freezing and storage. Each semen straw was thawed in a 37°C water bath for 30 s for post-thaw analysis. Overall and progressive sperm motilities were assessed in each extended sample using computer-automated semen analysis before and after freezing, and percent motility decline was calculated for each parameter. Data were analyzed using a General Linear Models procedure for all analyses of variance in SPSS with a Tukey HSD test for post-hoc analysis. Percent decline in overall motility for AM (49 ± 7.9%) tended to be less than for BI4 (71 ± 3.6%; P = 0.09); however no differences in overall motility percent decline existed between the extenders OR (50 ± 3.8%), TR (51 ± 9.2%), BI8 (62 ± 3.7%), and BI6 (69 ± 3.2%; P ≥ 0.14). Percent decline in progressive motility for AM (51 ± 8.3%) was less than for BI4 (90 ± 1.8%), BI6 (85 ± 2.6%), BI8 (82 ± 3.6%), and TR (69 ± 9.9%; P ≤ 0.01). Percent decline in progressive motility for OR (67 ± 2.4%) also differed from that of BI4 (P = 0.02), but did not differ from AM (P = 0.16) or any of the other extenders (P ≥ 0.11). The use of soybean-based AM semen extender resulted in less of a decline in progressive sperm motility following cryopreservation compared to all egg yolk-based extenders used, except OR, and can be considered a better option for semen cryopreservation in white-tailed deer.

Keywords: Cryopreservation, extender, semen motility, white-tailed deer